AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A process for forming a metal damascene structure, comprising the following steps:

forming a dielectric layer overlying a first metal layer;

etching the dielectric layer to form a damascene opening and expose the first metal layer, wherein impurities are formed on the exposed first metal layer;

treating the exposed first metal layer using ~~a plasma containing nitrogen and oxygen~~ an N_2O plasma to remove the impurities thereon; and

filling a metal in the damascene opening.

2. (Previously Presented) The process as claimed in claim 1, wherein the plasma further contains hydrogen.

Claims 3-6 (Cancelled).

7. (Original) The process as claimed in claim 1, wherein the damascene opening is a via.

8. (Original) The process as claimed in claim 7, wherein the damascene opening further comprises a trench above the via.

9. (Original) The process as claimed in claim 8, wherein the metal filling step includes filling copper or copper alloy in the trench and the via.

Claim 10 (Cancelled).

11. (Previously Presented) The process as claimed in claim 1, wherein the first metal layer is copper or copper alloy.

Claims 12-14 (Cancelled).

15. (Previously Presented) The process as claimed in claim 1, after the first metal layer is formed and before the dielectric layer is formed, further comprising forming a cap layer on the first metal layer.

16. (Original) The process as claimed in claim 15, wherein the cap layer is nitride or silicon carbide.

Claim 17 (Cancelled).

18. (Currently Amended) A process for forming a metal damascene structure, comprising the following steps:

forming a cap layer on a first metal layer;

forming a dielectric layer on the cap layer;

etching the dielectric layer and the underlying cap layer with fluorine-containing plasma or chlorine-containing plasma to form a damascene opening and expose the first metal layer, wherein impurities are formed on the exposed first metal layer;

plasma treating the exposed first metal layer using ~~a plasma containing nitrogen and oxygen~~ an N_2O plasma to remove the impurities thereon; and

filling a metal in the damascene opening.

19. (Previously Presented) The process as claimed in claim 18, wherein the plasma further contains hydrogen.

Claim 20 (Cancelled)

21. (Original) The process as claimed in claim 18, wherein the damascene opening is a via.

22. (Original) The process as claimed in claim 21, wherein the damascene opening further comprises a trench above the via.

23. (Original) The process as claimed in claim 22, wherein the metal filling step includes filling copper or copper alloy in the trench and the via.

24. (Original) The process as claimed in claim 18, wherein the first metal layer is copper or copper alloy.

25. (Original) The process as claimed in claim 18, wherein the cap layer is nitride or silicon carbide.

Claims 26- 33 (Cancelled).

34. (Currently Amended) A process for forming a metal damascene structure, comprising the following steps:

forming a cap layer on a first metal layer;

forming a dielectric layer on the cap layer;

forming a photoresist pattern on the dielectric layer, wherein the photoresist pattern contains carbon;

etching the dielectric layer and the underlying cap layer using the photoresist pattern as a mask to form a damascene opening and expose the first metal layer, wherein impurities are formed on the exposed first metal layer;

plasma treating the exposed first metal layer using ~~a plasma containing nitrogen and oxygen~~ an N_2O plasma to remove the impurities thereon; and

filling a metal in the damascene opening.

35. (Original) The process as claimed in claim 34, wherein the etching step uses fluorine-containing plasma or chlorine-containing plasma.

Claim 36 (Cancelled)

37. (Original) The process as claimed in claim 34, wherein the damascene opening is a via.

38. (Original) The process as claimed in claim 37, wherein the damascene opening further comprises a trench above the via.

39. (Original) The process as claimed in claim 38, wherein the metal filling step includes filling copper or copper alloy in the trench and the via.

40. (Original) The process as claimed in claim 34, wherein the cap layer is nitride or silicon carbide.